Project Category: Cross Ecosystems

Project Title: Current and Future Distribution and Abundance of North Pacific Birds in the Context of Climate Change

Project Leader: Grant Ballard, PhD, PRBO Conservation Science, gballard@prbo.org, 707.781.2555 ext. 340

Cooperators/Partners: Sam Veloz, PhD., PRBO Conservation Science, sveloz@prbo.org, 707.781.2555 ext. 308; Bob Altman, American Bird Conservancy, baltman@abcbirds.org, 541-745-5339; John Alexander, Klamath Bird Observatory, jda@KlamathBird.org, 541.201.0866

Project Summary

We propose to aggregate the avian datasets for a large portion of the North Pacific LCC (Northern California, Oregon, and Washington) and use these data to model current and future distributions and abundance under three future climate models representing scenarios of low, medium and high projected temperature increases for the Pacific Northwest (Salathé et al, 2007) to provide example outcomes and interactive tools essential for conservation planning. The work will leverage large investments made by PRBO and the partners of the California Avian Data Center (data.prbo.org/cadc) to apply existing cyberinfrastructure and modeling approaches to this region. We have extensive experience developing decision support tools in the context of adaptive conservation frameworks, and the tools developed in this project will be targeted to specific conservation applications. For example, the products will allow regional managers to identify the locations of highest current and future conservation priorities for birds and the ecosystems upon which they rely, assess the degree of uncertainty associated with these projections, and explore the possibilities under different future climate scenarios (Fig. 1).

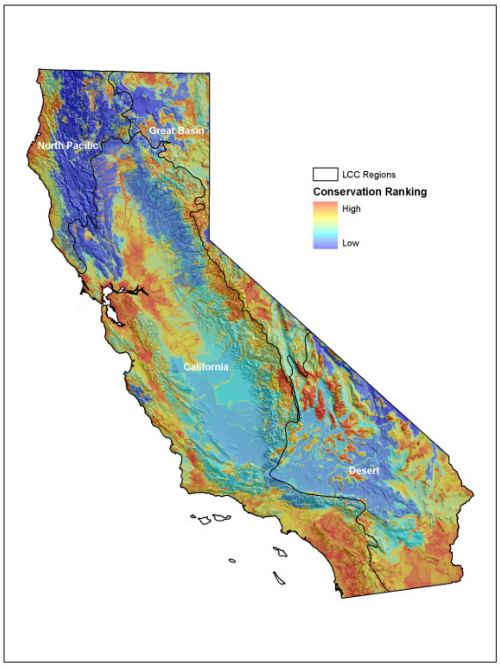

Figure 1 Conservation prioritization for 199 CA bird species combining predictions for current and future climate from two future climate models. Warm colors indicate higher conservation priority. The model discounts the estimated conservation value of pixels with high uncertainty.

Background and Need

Elements of the North Pacific LCC Addressed:

This proposal addresses all five elements listed in the request for proposals. Specifically:

1. We will integrate the majority of avian observation data available for the region and adapt existing informatics systems so that new data can continue to be integrated. We will also aggregate GIS coverages of downscaled climate products and covariates important to determining bird distribution and abundance. All data and results will be securely archived and made publicly accessible online via interactive maps and other query tools.
2. We will create an analytical interface to the data described above, allowing users to explore current and future distributions and abundances given different climate change scenarios.
3. We will produce interactive maps of current and future high priority areas for focal bird species to identify connectivity needs and conservation opportunities.
4. We will identify the most important environmental determinants of current and future bird distribution and abundance.
5. We will use downscaled climate products to assess which bird species and populations are at greatest risk of declines or local extirpation under different future scenarios.

Components addressed from the conservation goals proposed by the NPLCC Interim Planning Team:

This proposal addresses five of the six conservation goals proposed by the NPLCC Interim Planning Team. Specifically:

1. The maps showing areas of highest current and future conservation priorities will reveal opportunities for resource managers to collaborate in their climate adaptation strategies. Our models will identify the most important environmental factors driving the predictions; specific planning and management actions can be developed around this knowledge.
2. The results of the project will be publicly accessible via the Internet, including downloadable GIS layers, and we will promote the use of the tool for adaptation planning among our partners in the region.
3. The maps of poorly sampled environmental space, uncertainty in current and future distributions and abundance will highlight places and ecosystems where monitoring or more data collection can be most effective in reducing uncertainty of current and future projections.
4. The models will provide detailed information about the relationship between bird distribution/abundance, their environment, and climate.
5. The products will be delivered in a format suitable for public consumption on the Internet, thereby allowing users to explore and visualize the effects of different climate scenarios on bird populations.

Objectives

The project has four essential objectives which are described in detail below: 1) Aggregate the existing bird distribution and abundance data and spatial covariate data for the region 2) Ensure long term curation and accessibility of these data 3) Analyze the data to build models accurately describing the relationship between birds and their environment in the region and 4) Disseminate the results via online decision support tools, other websites, direct outreach to stakeholders in the region (e.g., webinars), and the peer reviewed literature. The final products will support conservation planning and decisions for the major habitat types in the region, and will serve as a framework for replication in the northern part of the LCC, other LCC's, and for more taxa in the future.

Methods

1. Aggregate the existing bird distribution and abundance data and spatial covariate data. KBO (Alexander) and ABC (Altman) will synthesize and integrate significant data to develop distribution and abundance models for 25-30 bird species in the California, Oregon, and Washington portions of the NPLCC. Our partners in this region have conducted extensive standardized count data studies, and we have provided leadership and/or cooperation in many of these efforts. We are confident in our ability to access data from 20-30 among these studies to support this project. Examples include long-term regional efforts such as eight years of USFS monitoring in late-successional coniferous forests, 5-10 years of forest thinning monitoring at several sites, long-term site-specific efforts such as 10 years of prairie-oak monitoring at Fort Lewis Military Installation, and numerous shorter-term, site-specific efforts.

The species models we develop will include USFWS Birds of Conservation Concern, State Wildlife Action Plan Species of Greatest Conservation Need, and Partners in Flight Focal Species. Studies and species will include representation from the primary habitat types in this region, including conifer forest, mixed hardwood-conifer forest, prairie-oak habitats, and riparian. We will select focal species that represent a range of habitat conditions or successional stages within these habitat types (e.g., Olive-sided Flycatcher for older, open coniferous forest and Hermit Warbler for younger, closed coniferous forest; Band-tailed Pigeon for a landscape mosaic of mixed-conifer forest types and age classes, Yellow Warbler for riparian woodlands). Developing models and associated outputs of species across a gradient of conditions provides for a broader understanding of projected changes due to climate or other factors, and the ability to examine "what if" scenarios between habitats and/or species.

Based on methods we developed for predicting bird distributions within CA (http://data.prbo.org/cadc2/index.php?page=climate-change-distribution) we will also aggregate gridded climate and vegetation data representing late 20th century conditions to model bird abundance and distributions. We will derive biologically meaningful climatic layers based on late 20th century 30-year averages of spatially interpolated observations of temperature and precipitation (Daly et al., 1994). For future climate, we will obtain statistically downscale outputs from 3 future general circulation models (GCM) used for the IPCC 4th assessment report (http://www.ecoclim.org/). We will further downscale these GCM projections to match the spatial resolution of our contemporary climate data (~800m). We will use the ReGap dataset for characterizing present day vegetation. We will create maps of future vegetation by modeling the correlation of each vegetation type with current climate and soil variables and projecting these models to future climate conditions (Stralberg et al. 2010).

2. Ensure long term curation and accessibility of these data. The California Avian Data Center (CADC; data.prbo.org/cadc; Ballard et al. 2010) is a regional node of the Avian Knowledge Network (AKN; www.aviankowledge.net) hosted by PRBO. It is an in-use, secure and well-tested platform providing a powerful, cost-effective solution to the data consolidation and management needs of the region's bird monitoring community, currently curating > 88 million bird observations spanning 4 decades. This project will make full use of the CADC infrastructure and as such will have access to the common data and data query/visualization resources of the entire AKN. By using CADC, we will provide a safe repository for controlled access to all avian observation data for the study region, with the goal of providing managers, analysts, and other users as complete access to data as possible based on access rights. Data owners will control the access rights, from restricted (no access outside of project) to full public availability, following AKN data access level controls as specified by data owners (please visit the AKN website for more information). All system hosting and administration tasks (e.g., data backup and recovery) will be performed by PRBO, with the ability of data owners to download a complete copy of all project observation data at any time, in several standard formats.

3. Analyze the data to build models accurately describing the relationship between birds and their environment in the region. We (led by Veloz) will combine focal/priority bird occurrence and abundance data with environmental covariates to predict future bird distributions and abundance throughout the study region using statistical species distribution models. All available occurrence data for the focal species will be used to develop distribution models based on current and future climate data. Maps of current and future distributions can be used to identify which species are most sensitive to future climate change and also to produce maps highlighting future changes in bird species richness and bird community composition (see data.prbo.org/apps/ecn for examples).

We will produce estimates of abundance for the focal bird species starting from at least four different data sources (these are ones that are already incorporated in the AKN; we anticipate including several others as described in Section 1): PRBO point count data, KBO point count data, KBO area search data, and the Breeding Bird Survey (BBS). We will estimate abundance from datasets by applying repeated-count hierarchical models to all the repeated-count datasets (Royle and Nichols 2003), and Bayesian hierarchical models to the BBS data (Sauer et al. 2003). Estimates will be produced using all years available in the data and at the finest spatial resolution possible. Predictive models will be built separately for abundance estimates from each dataset at the appropriate spatial resolution; each predictive model will then be used to predict across the study region, averaging predictions across all models.

Individual species predictions will be used to identify species that are sensitive and vulnerable to climate change. We will combine current and future predictions using Zonation conservation planning software

(Moilanen 2007) to our existing models of present and future species distribution and abundance to develop hierarchical conservation priorities of current, future, and combined geographies for birds in the Northern LCC (Figure 1). The Zonation-derived priority areas will differ from diversity hotspots in that core areas for all focal species will be simultaneously retained. Estimates of uncertainty can be included in the Zonation analysis to discount pixels with high uncertainty. The proposed products will expand the scope of ongoing projects by PRBO which encompass neighboring LCC regions. Results will be compared with existing protected area networks, and the results can be used to guide future conservation efforts.

To guide future monitoring efforts, we will evaluate which regions of current and future environmental space have been poorly sampled by our avian observation data. We will compare the environmental data at locations which contain bird observations to environmental data at all locations across the study region, using metrics of environmental distance, as a way to identify un-sampled environmental space based on both current and future climate conditions. Areas with high environmental distance also indicate regions where predictions of avian distribution and abundance are more uncertain because the models must extrapolate predictions. Future monitoring efforts can be targeted, for example, in areas that are predicted to support high abundance of species, but also have high model uncertainty. PRBO has recently completed a similar effort for the state of California (with support from the California LCC) which will provide significant efficiencies in process based on experience, and also continuity in outputs for the entire west coast (Stralberg et al. 2010, Wiens et al. 2010, data.prbo.org/cadc and data.prbo.org/apps/ecn).

4. Publish the results via online decision support tools, other websites, and the peer reviewed literature. We (led by Ballard) will produce a website that allows users to interact with the models, based on CADC's California LCC supported "Where Will the Birds Be?" and Environmental Change Network projects. These websites allow users to view maps of different model outputs for current and future climate scenarios, download and query the data, and explore model parameters. We anticipate producing at least one peer-reviewed article, likely focused on highlighting conservation priorities for birds and their ecosystems in the region (target journal: Biological Conservation or Ecological Applications). ***Outreach/Communication:*** In addition to the products listed above, we will also host at least 3 webinars for our partners and management agencies to describe the main findings of our work and demonstrate use of the web tools we produce. We will also produce press releases around any significant publications arising from the work.

Timeline

Task	Sep 2011	Dec 2011	Mar 2012	Jul 2012	Sep 2012
Identify and aggregate all suitable environmental data	X	X			
Identify and aggregate all suitable avian data		X			
Model current distribution & abundance		X	X		
Model future distribution & abundance in climate scenarios; conservation prioritization; estimates of uncertainty			X	X	X
Design & implement websites to interact with model outputs, deliver GIS products, etc.				X	X
Produce report / manuscript					X

Data Sharing Disclaimer: We are aware of no restrictions on sharing the data we expect to generate via this project.

Literature Cited:

Daly, C. Neilson, R. P., Phillips, D.L. 1994. A statistical topographic model for mapping climatological precipitation over mountainous terrain. J. Appl Meterol 33: 140-158.

Moilanen, A. 2007. Landscape Zonation, benefit functions and target-based planning: Unifying reserve selection strategies. Biol. Cons. 134:571-579.

Royle, J.A. and J.D. Nichols. 2003. Estimating abundance from repeated presence-absence data or point counts. Ecology 84:777-790.

Sauer, J.R., J.E. Fallon, and R. Johnson. 2003. Use of North American Breeding Bird Survey data to estimate population change for bird conservation regions. J. Wildlife Management 67:372-389.

Salathé Jr., E.P., Mote, P.W., Wiley, M. W. 2007. Review of Scenario selection and downscaling methods for the assessment of climate change impacts on hydrology in the United States pacific northwest. International Journal of Climatology. 27:1611-1621.

Stralberg, D., D. Jongsomjit, C. A. Howell, M. A. Snyder, J. D. Alexander, J. A. Wiens, and T. L. Root. 2009. Reshuffling of species with climate disruption: a no-analog future for California birds? PLoS ONE 4:e6825. doi:10.1371/journal.pone.0006825

Wiens, J.A., D. Stralberg, D. Jongsomjit, C.A. Howell, and M.A. Snyder. 2009. Niches, models, and climate change: Assessing the assumptions and uncertainties. Proc. Natl. Acad. Sci. USA 106:19729-19736.

Biographical Sketch: Grant Ballard

EDUCATION

- University of Auckland, Auckland, NZ. PhD (2010): Ecology, Evolution and Behavior
- Cornell University, Ithaca NY. BA (1989): English

APPOINTMENTS

- 2011 – Climate Change and Informatics Director, PRBO Conservation Science
- 2007 – 2011 – Informatics Division Director, Antarctic Program Leader, PRBO
- 2006 – 2007 – Senior Conservation Scientist and Informatics Program Director, PRBO
- 1994 – 2006 – Senior biologist, data manager, and analyst, PRBO

SELECTED CURRENT AND RECENT PROJECTS

2010-2015: (co-PI) Adélie penguin response to climate change at the individual, colony and metapopulation levels – funded by National Science Foundation- more information

2010-2011: (co-PI) How do we monitor the ecological consequences of climate change? Developing an Environmental Change Network in the California Landscape Conservation Cooperative – funded by US Fish and Wildlife Service – more information

2010-2011: (PI) Tidal Marsh Bird Population and Habitat Assessment for SF Bay Under Future Climate Change Conditions – funded by US Fish and Wildlife Service – more information

2010-2012: (co-PI) Preparing for Sea-Level Rise Along the San Francisco Bay Area's Outer Coast – funded by NOAA –SARP – more information

2006-2010: (co-PI) Multi-scaled data in ecology: Scale dependent patterns in the environment - funded by National Science Foundation.

SELECTED RELEVANT PUBLICATIONS & MAJOR INFORMATICS PRODUCTS (full list available here)

Ballard, G., M. Herzog, M. Fitzgibbon, D. Moody, D. Jongsomjit, D. Stralberg. 2008. The California Avian Data Center. [web application]. Petaluma, California. http://www.prbo.org/cadc.

Kelling, S., W.M. Hochachka, D. Fink, M. Riedewald, R. Caruana, **G. Ballard**, G. Hooker. 2009. Data Intensive Science: A New Paradigm for Biodiversity Studies. Bioscience 59:613-620.

Lepage D, Kelling S, **Ballard G**. 2005. The Bird Monitoring Data Exchange Schema. (7 May 2009; http://www.avianknowledge.net/content/about/bird-monitoring-data-exchange)

Martín, E. and **G. Ballard**. 2010. Data Management Best Practices and Standards for Biodiversity Data Applicable to Bird Monitoring Data. U.S. North American Bird Conservation Initiative Monitoring Subcommittee. Online at http://www.nabci-us.org/.

Veloz, S., M. Fitzgibbon, D. Stralberg, S. Michaile, D. Jongsomjit, D. Moody, N. Nur, L. Salas, J. Wood, **G. Ballard**. 2011. San Francisco Bay sea level rise: Climate change scenarios for tidal marsh habitats. [web application]. Petaluma, California. http://www.prbo.org/sfbayslr. (Accessed: March 31, 2011).

SYNERGISTIC ACTIVITIES

Member of the Landscape Conservation Cooperative Science & Informatics subcommittees, California Department of Fish and Game Climate Stakeholders Working Group; delegate to USGS National Climate Change and Wildlife Climate Science Center organizational workshop (2009) and USFWS CA Landscape Conservation Cooperative organizational workshops (2010/11); leader of the Avian Knowledge Alliance (2007-2008); Co-founder and board member, Oikonos, ecosystem knowledge (www.oikonos.org).

Samuel D. Veloz

PRBO Conservation Science
3820 Cypress Dr, #11
CA, 94954
sveloz@prbo.org
707-781-2555 x308

136 Countrywood Ct.
Petaluma, CA 94954
Home (707) 774-6232
Cell (530) 204-8438

EDUCATION

Ph.D. Ecology, University of California Davis, September 2002-July 2008

Research Specialization: Ecological modeling using geospatial technologies
Primary Teaching Experience: Ecology and conservation and Environmental policy and planning
Dissertation Focus: Environmental niche modeling, remote sensing and GIS modeling; wildlife foraging and spatial habitat analysis
Advisor: Deborah Elliott-Fisk

B.A. Environmental Studies, Minor in Latin American Studies,
University of California, Santa Cruz, June 1997.

RESEARCH EXPERIENCE

PRBO Conservation Science, Spatial Ecologist current

Bryson Interdisciplinary Climate People and the Environment postdoctoral fellow, Department of Geography, Center of Climatic Research, University of Wisconsin Madison. 8/2009-7/2010. Advisor: Jack Williams

Postdoctoral Researcher, Department of Environmental Science and Policy, UC Davis,7/08-8/09
Advisor: Susan Harrison.

Doctoral Research, UC Davis, 9/02- 9/08

Environmental Services Intern, Calif. State Parks, Monterey District. (10/98 – 8/02)

PEER REVIEWED PUBLICATIONS

Veloz, S.D. (2009) Spatially autocorrelated sampling falsely inflates measures of accuracy for presence-only niche models. *Journal of Biogeography*. 36: 2290-2299.

Veloz, S.D. , Williams J, Vavrus, S. Vimont, D. Lorenz, D. Identifying climatic analogs for Wisconsin under 21st-century climate-change scenarios. *Climatic Change (*In review)

Veloz, S. D., Anacker, B. Safford, H. Identifying factors that may limit the transferability of species distribution models for future climate change. *Journal of Biogeography. (*In review)

Williams, J. Kharouba, H., **Veloz, S.D**. McLachlan,J., Vellend, M., Liu, Z., Otto-Bliesner, B., He, F. The Ice Age Ecologist: Testing Methods for Reserve Prioritization and Biodiversity Conservation During the Last Global Warming. *Global Ecology and Biogeography*, Special issue (In review)

PUBLICATIONS IN PREPARATION

Veloz, S.D., Nur, N., Salas, L., Stralberg, D., Jongsomjit, D., Wood, J. Liu, L., Ballard, G. Tidal marsh bird population and habitat assessment for the San Francisco Bay Estuary under future climate change scenarios. Target journal: *Ecological Applications*

Nogues-Bravo, D.*, **Veloz, S.D.***, Brewer, S., Arrajo, P., Haywood, A., Rahbek, C., Rodriguez, J., Valdes, P., Williams, J. Reevaluating future extinction risk with a combination of contemporary and paleoecological data. Target journal: *Proceedings of the National Academy of Science.* *Co-first authors

Veloz, S.D., John Williams, Feng He, Zhengyu Liu, Bette Otto-Bliesner. No-Analogue Climates and Shifting Realized Niches During the Late Quaternary: Implications for Species Distribution Models. Target journal: *Global Change Biology*

GRANTS AND AWARDS

UC Davis Alliance for Graduate Education and the Professoriate Fellowship, 2007-2008
UC Davis Dissertation Year Fellowship, $30,000.00 2006/2007
Fullbright Student Program, Alternate, 2006.
University of California Pacific Rim Research Program, Mini-Grant Recipient, 2004, $2500.00
CalSpace & California Space Grant Consortium NASA Space Grant Graduate Fellowship, Winter 2004 & Winter 2005, $8000.00
Jastro Shields Research Fellowship, 2003, 2006, $1750.00.
UC Davis Ecology Graduate Group Block Grant Recipient, 2004, 2006.
National Science Foundation, Integrative Graduate Education and Research Trainee (IGERT), short-term fellow, Summer 2003
National Science Foundation, Pre-Doctoral Graduate Research Fellowship Honorable Mention 2003.

CONFERENCE PRESENTATIONS

Veloz, S.D., Williams, J., McLachlan, J. Ecological Society of America, 2010. Predicting Species' Past and Future Response to Novel Climates.

Veloz, S.D., Anacker, B. Safford, H. Evolution, 2009. Predictive Modeling of Cheatgrass invasion risk for the Lake Tahoe Basin-Accounting for Climate Change

Grossenbacher, D.L., **Veloz, S.D.,** Sexton, J. and Whittall, J.B..Ecological Society of America, 2008. Niche evolution is related to speciation: A test within the genus *Mimulus.*

Veloz, S.D. Bay Area Conservation Biology Symposium, 2008. Predicting large scale movements of nomadic species using GIS/remote sensing data and novel statistical models

INVITED TALKS

Yi-Fu Tuan Lecture, Department of Geography, University of Wisconsin, Madison. Climate change, novel climates and predicting species responses: advancing theory and informing management.

Wildlife Society, UC Davis. Landscape Level Foraging Ecology of the Little Red Flying Fox, *Pteropus scapulatus.*

REFEREE ACTIVITIES

Journal of Biogeography, Marine Ecology Progress Series

Bob Altman

American Bird Conservancy

311 NE Mistletoe

Corvallis, OR 97330

baltman@abcbirds.org www.abcbirds.org

Education:

B.S., Wildlife Management, Eastern Kentucky University (1981)

Graduate coursework at Oregon State University

Employment:

1998-present, *American Bird Conservancy*

Coordinator - Northern Pacific Rainforest Bird Conservation Region

Science Coordinator – Pacific Coast Joint Venture
Responsible for collaborations with a wide variety of partners to advance bird conservation from northwestern California through southeastern Alaska. Areas of emphasis have included preparation of conservation and habitat management plans, monitoring/research on prairie-oak and conifer forest habitats and birds, bird conservation on private lands, and developing products for professionals and non-professionals to support land management and bird conservation.

1992-1998, *Avifauna Northwest*
Conducted bird monitoring and research projects on a variety of communities, species, and issues such as grassland birds, Olive-sided Flycatcher, salvage logging in lodgepole pine, Willow Flycatcher, riparian forests, and Marbled Murrelet. Prepared bird monitoring program development document and conducted annual training (11 years) on bird identification.

1988-1993 *Beak Consultants*
Provided expertise in areas of terrestrial ecology, with emphasis on wildlife habitat, nongame wildlife, avian ecology, and threatened and endangered species. General responsibilities: conduct wildlife surveys; evaluae wildlife habitat quality; wildlife impact assessments; threatened and endangered species assessments; data analysis; and project management.

Tempoary/Seasonal Positions:

1987, *U.S. Army Corps of Engineers*

1984-1986, *Oregon Department of Fish and Wildlife*

1983, *Maryland Department of Natural Resources*

1982, *Patuxent Naval Air Station*

1982, *U.S. Forest Service*

Publications:

Altman, B. 2011. Historical and current distributions and populations of prairie-oak birds in the Pacific Northwest. Northwest Science (*in press*).

Slater G.L. and B. Altman. 2011. Avian restoration in the prairie-oak ecosystem: a reintroduction case study of western bluebirds to San Juan Island, Washington. Northwest Science (*in press*).

Altman, B., M.T. Green, B. Bresson, E. Stockenberg, D. Casey, and S. Casey. 2010. A watershed analysis for establishing local population objectives for Pacific-slope Flycatchers and a suite of mid-to-late successional Pacific Northwest landbirds. Pp. 18-25 *in* Integrating ecosystem management : science and process for landbird conservation in the western United States (J.L. Stephens, K. Kreitenger, C.J. Ralph,and M.T. Green eds.). U.S. Fish and Wildlife Service Biological Technical Publication FWS/BTP-R1014-2010, Washington, D.C. *(in press*)

Stockenberg, E., B. Altman, M. Green, and J. D. Alexander. 2008. Using GAP in landbird biological objective-setting: Process and examples from oak habitats in the Pacific Northwest. The Gap Analysis Bulletin 15:34.

Altman, B. and J. Hagar. 2006. Rainforest Birds: a land manager's guide to breeding bird habitat in young conifer forests in the Pacific Northwest. U.S. Geological Survey Scientific Investigations Report, 2006-5304. 60 pp.

Campbell, B.H., B. Altman, E.E. Bangs, D.W. Smith, B. Csuti, D.W. Hays, F. Slavens, K. Slavens, C. Schultz, and R.W. Butler. 2006. Restoring Wildlife Populations. Chapter 15, Pp.351-373 *in* Restoring the Pacific Northwest: the art and science of ecological restoration in Cascadia (D. Apostol and M. Sinclair eds.). Island Press, Washington, D.C.

Altman, B. 2005. Conservation priorities for landbirds of the Pacific Coast of Oregon. Pp 143-148 *in* C.J. Ralph and T.D. Rich (eds.) Bird Conservation Implementation and Integration in the Americas: Proceedings of the Third International Partners in Flight Conference. USDA Forest Service General Technical Report PSW-GTR-191. Vol.1, 651 pp.

Altman, B., M. Boulay, S. Dowlan, D. Crannell, K. Russell, K. Beal, and J. Dillon. 2002. Willow flycatcher nesting ecology and habitat relationships in the Willamette Basin, Oregon. Studies in Avian Biology 26:73-80.

Altman, B., M. Hayes, S. Janes, and R. Forbes. 2001. Wildlife of Westside Grassland and Chaparral Habitats. Chapter 10, pp 261-291 *in* Wildlife-Habitat Relationships in Oregon and Washington (D.H. Johnson and T. A. O'Neil, managing directors). Oregon State University Press, Corvallis.

Altman, B., and R. Sallabanks. 2000. Olive-sided Flycatcher (*Contopus cooperi*). *In* The Birds of North America, No.502 (A. Poole and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA.

Altman, B., C. Henson, and I. Waite. 1997. A summary of information on aquatic biota and their habitats in the Willamette Basin, Oregon, through 1995. U.S. Geological Survey. Water Resources Investigation Rept. 97-4023. 174 pp.

Altman, B. 1993. A documented nesting of the eastern kingbird in western Oregon. Oreg. Birds 20(2):56-57.

Altman, B. and E.K. Eltzroth. 1987. Observations from a "bluebird field" in western Oregon. Sialia 9(4):133-136.

Altman, B. and R.D. Gano. 1984. Least terns nest alongside Harrier jet pad. J. of Field Ornithology 55(1):108-109.

Altman, B. 1983. Post-release flight and foraging behavior of a bald eagle hacked in western Kentucky. Raptor Research 17(2):37-42.

Altman, B. 1983. The effect of time of day on a winter bird survey. The Kentucky Warbler 59(2):23-26.

John D. Alexander

EDUCATION

PhD Candidate - Prescott College, anticipated graduation May 2011
Develop and test a strategy to integrate bird conservation within the federal land management paradigm through applies science that is management and policy relevant.
Master of Science - Southern Oregon University, 1999
Bird and habitat relationships in the Klamath Mountains and the influence of forest structure on the distribution of old growth associated bird species.
Bachelor of Science - Evergreen State College, 1992

WORK EXPERIENCE

Klamath Bird Observatory: Executive Director, 2000-2011 (Current Position)
Through excellent science, produce results from landscape level ecological studies for scientific outlets, land managers, and the public. Trough education provide land managers and communities with tools that inform decisions regarding land management and conservation. Oversee 8 full-time staff, 15-30 seasonal staff, graduate and undergraduate intern students and independent contractors, and all aspects of business operations.

Sole Proprietor, 1999
Transitioned specific research and monitoring projects into a regional science-based bird conservation program. Prepared for the incorporation of a not-for-profit scientific and educational corporation.

Southern Oregon University: Research Associate, 1998-1999
Coordinated 3 extensive management related bird research and monitoring programs.

Klamath National Forest: Landbird Monitoring Coordinator, 1992-1998
Built comprehensive landbird monitoring program linking international, regional and forest conservation priorities with a forest management plan.

PROFESSIONAL AWARDS

- US Forest Service Wings Across the Americas International Cooperation Award, 2011
- Partners in Flight Leadership Award, 2007
- Joint Fire Sciences Program Principal Investigators Workshop Best Scientist-Manager Partnership, 2004
- US Forest Service and Duck Unlimited National Taking Wing Award, 2003

PROFESSIONAL POSITIONS

- Federal Advisory Committee Member 2007-2010, USDA Forest Research Advisory Council
- Representative 2003-2011, Council Chair 2011. North American Banding Council representing the Western Bird Banding Association
- Committee Member 2011, North American Bird Conservation Initiative State of the Birds Science Committee
- Committee Member 2007-2011, North American Bird Conservation Initiative Monitoring Sub-committee

- Co-Chair 2010-11. Partners in Flight National Steering Committee
- Board of Directors 2004-2011, President 2006-2008. Western Bird Banding Association
- Committee Member 2002-2011. California Partners In Flight Executive Steering Committee
- Committee Member 2004-2007. Oregon Department of Fish and Wildlife Technical Committee
- Committee Member 2008-2011. Intermountain West Joint Venture Landbird Technical Committee
- Committee Member 2011. Intermountain West Joint Venture Waterbird Technical Committee
- Manuscript Reviewer 2003. Cooper Ornithological Society Studies in Avian Biology
- Proposal Review Panel 2005, 2009. Joint Fire Sciences Program

RELATED PUBLICATIONS

Alexander, J. D. In Press. Integrating Partners in Flight bird conservation and priority land management objectives. In Informing Ecosystem Management: Science and Process for Landbird Conservation in the Western United States. Biological Technical Publication BTP-R1xxx-xxxx, ed. J. L. Stephens, K. Kreitinger, C. J. Ralph, and M. T. Green. Portland, Oregon: U.S. Department of Interior, Fish and Wildlife Service.

Alexander, J. D., C. J. Ralph, K. Hollinger, and B. Hogoboom. 2004. Using a wide-scale landbird monitoring network to determine landbird distribution and productivity in the Klamath Bioregion. In Proceedings of the Second Conference on Klamath-Siskiyou Ecology., ed. K. L. Mergenthaler, J. E. Williams, and J. Jules, 33-41. Cave Junction, Oregon: Siskiyou Field Institute.

Alexander, J. D., N. E. Seavy, and P. E. Hosten. 2007. Using conservation plans and bird monitoring to evaluate ecological effects of management: An example with fuels reduction activities in southwest Oregon. Forest Ecology and Management 238: 375-383.

Alexander, J. D., N. E. Seavy, C. J. Ralph, and B. Hogoboom. 2006. Vegetation and topographical correlates of fire severity from two fires in the Klamath-Siskiyou region of Oregon and California. International Journal of Wildland Fire 15 (2): 237-245.

Alexander, J. D., J. L. Stephens, and N. E. Seavy. 2008. Livestock utilization and bird community composition in mixed-conifer forest and oak woodland in southern Oregon. Northwest Science 82 (1): 7-17.

Alexander, J. D., J. L. Stevens, G. R. Geupel, and T. C. Will. 2009. Decision support tools: bridging the gap between science and management. In Tundra to Tropics: Connecting Birds, Habitats and People. Proceedings of the 4th International Partners in Flight Conference, 13-16 February 2008, ed. T. D. Rich, C. Arizmendi, D. Demarest, and C. Thompson, 283-291. McAllen, TX, USA: Partners in Flight.

Betts, M. G., J. C. Hagar, J. W. Rivers, J. D. Alexander, K. McGarigal, and B. C. McComb. 2010. Thresholds in forest bird occurrence as a function of the amount of early-seral broadleaf forest at landscape scales. Ecological Applications 20 (8): 2116-2130.

Fuller, T. L., S. S. Saatchi, E. E. Curd, E. Toffelmier, H. A. Thomassen, W. Buermann, D. F. DeSante, et al. 2010. Mapping the risk of avian influenza in wild birds in the US. BMC Infectious Diseases 10 (1): 187.

Hosten, P. E., H. Whitridge, D. Schuster, and J. Alexander. 2007. Livestock on the Cascade-Siskiyou National Monument: A summary of stocking rates, utilization, and management. Medford, Oregon: USDI Bureau of Land Management.

Huff, M. H., N. E. Seavy, J. D. Alexander, and C. J. Ralph. 2005. Fire and birds in maritime Pacific Northwest. Studies in Avian Biology 30: 46-62.

Seavy, N. E., and J. D. Alexander. 2006. Measuring ecological effects of prescribed fire using birds as indicators of forest conditions. In Fuels management—How to measure success: Conference proceedings, ed. P. L. Angermeier and B. W. Butler, RMRS-P-41:593-603. Fort Collins, Colorado: U.S. Department of Agriculture,

Forest Service, Rocky Mountain Research Station. http://www.fs.fed.us/rm/pubs/rmrs_p041/rmrs_p041_593_603.pdf.

Seavy, N. E., and J. D. Alexander. 2011. Interactive effects of vegetation structure and composition describe bird habitat associations in mixed broadleaf–conifer forest. The Journal of Wildlife Management 75 (2): 344–352.

Seavy, N. E., J. D. Alexander, and P. E. Hosten. 2008. Bird community composition after mechanical mastication fuel treatments in southwest Oregon oak woodland and chaparral. Forest Ecology and Management 256 (4): 774–778.

Seavy, N. E., S. Quader, J. D. Alexander, and C. J. Ralph. 2005. Generalized linear models and point count data: statistical considerations for the design and analysis of monitoring studies. In Bird Conservation Implementation and Integration in the Americas: Proceedings of the Third International Partners in Flight Conference. . 2002 March 20-24; Asilomar, California, Volume 1 and 2, General Technical Report PSW-GTR-191:744-753. Albany, California: USDA Forest Service.

Stephens, J. L., and J. D. Alexander. 2011. Effects of fuel reduction on bird density and reproductive success in riparian areas of mixed-conifer forest in southwest Oregon. Forest Ecology and Management 261 (1): 43-49.

Stephens, J. L., D. Hanni, J. D. Alexander, G. Ballard, G. R. Geupel, and B. L. Sullivan. 2009. The Avian Knowledge Alliance: A network of non-government organization working together ton bird conservation. In Tundra to Tropics: Connecting Birds, Habitats and People. Proceedings of the 4th International Partners in Flight Conference, 13-16 February 2008, ed. T. D. Rich, C. Arizmendi, D. Demarest, and C. Thompson, 412-414. McAllen, Texas, USA: Partners in Flight.

Stockenberg, E., B. Altman, M. Green, and J. D. Alexander. 2008. Using GAP in landbird biological objective-setting: Process and examples from oak habitats in the Pacific Northwest. The Gap Analysis Bulletin 15: 34.

Stralberg, D., D. Jongsomjit, C. A. Howell, M. A. Snyder, J. D. Alexander, J. A. Wiens, and T. L. Root. 2009. Re-shuffling of species with climate disruption: A no-analog future for California birds? PLoS One 4 (9).